DOCUMENT RESUME

ED 154 984 SE 023 895

TITLE	Controlling Household Pests. Home and Garden Bulletin No. 96.
INSTITUTION	Department of Agriculture, Washington, D.C.
PUB DATE	Mar 76
NOTE	33p.; Photographs may not reproduce well
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock Number 001-000-03468-5, $0.45)
EDRS PRICE	MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS	Biological Sciences; Biology; *Entomology; *Health; Health Education; Homemaking Education; Homemaking Skills; Insecticides; *Pesticides; *Reference Materials; Science Education

ABSTRACT

Reviewed are good housekeeping practices for eliminating and preventing the return of common household pests. Each category of pest is described individually including a description of their habits, the damage they do, and approved methods of control. (SL)

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controlling household pests

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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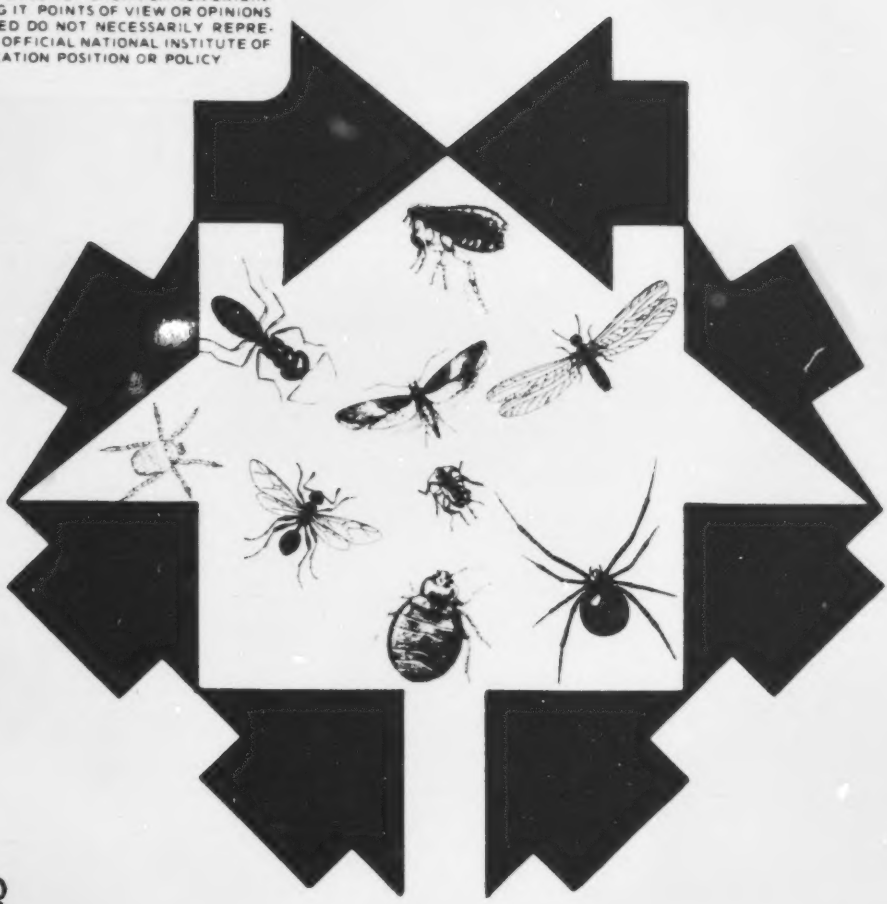

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U.S. DEPARTMENT OF AGRICULTURE
HOME AND GARDEN BULLETIN NO. 96

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CONTROLLING HOUSEHOLD PESTS

Most of the information for this publication was furnished by Southern Region, Agricultural Research Service[1]

Some household pests have an incredible ability to escape extinction. Cockroaches, for example, which have been on the earth millions of years longer than man, can subsist on any kind of food; they thrive in all parts of the world. Some species of cockroaches prefer man's home to other habitats. Once they enter it, they use countless instinctive tricks to keep from being evicted.

You can help control household pests by systematic housecleaning. You can rid your home of practically all pests, and *keep it free of them*, by a combination of continuous good housekeeping and the proper use of the right pesticide at the right time.

Suggestions for insect control are limited to uses in and around the home and do not apply to food handling establishments.

GOOD HOUSEKEEPING

It is easier to prevent pests from infesting your home than it is to get rid of them after they are established. Household pests seek available food, and places where they may hide and breed. If you eliminate these attractions from your home, the pests will look elsewhere for them.

Here are some basic rules to follow:

- Practice sanitation. Many household pests live on spilled food and organic matter that has not been completely cleaned up. They breed, multiply, and hide in small areas where food is left available to them—in cracks and crevices in cupboards, walls, and floors; around baseboards; and behind

[1]Information on the following subjects was contributed by the agencies indicated:

Bats, mice, and rats—Fish and Wildlife Service, U.S. Department of the Interior.

Powder-post beetles and termites—Forest Service, U.S. department of Agriculture.

kitchen drawers. They hide in seldom-used storage cabinets, behind washtubs, and around water pipes and toilets.

Keep these places clean. Frequent scrubbings with hot water and soap or detergent will do the job. (Scrub surfaces *before* treating them with pesticides; do not scrub newly treated surfaces.)

- Promptly dispose of garbage, bits of food, crumbs, scraps of fabrics, lint, and other waste materials that pests may eat or in which they may breed.
- Keep all foods in tightly closed containers, and keep the containers clean outside as well as inside. Before purchasing dry foods, examine the packages carefully for evidence of breaks and resultant insect infestation.
- Don't permit insect pests to hitchhike into your home. Cockroaches and silverfish often enter the house in the crevices of cardboard cartons used in transporting groceries or other materials. Don't leave these containers in the kitchen or basement where the pests may escape to infest your home.
- Permanently seal up places where pests may enter. You may not be able to close them all, but you can close most. Caulk the openings and cracks around wash basins, toilet bowls, water pipes, drain pipes, and radiator pipes. Fill in the cracks around baseboards and between floorboards. Cover openings where rats or mice may enter. See that windows and doors are tight fitting.
- Practice pest-prevention measures at all times. Application of pesticide may be needed to supplement good housekeeping. Follow the directions and heed all precautions on the pesticide label.

PESTICIDES AND THEIR APPLICATION

There are many kinds of pesticides, just as there are many kinds of pests. Housekeepers are concerned chiefly with *insecticides* to control insects, *miticides* to control mites, and *rodenticides* to control rodents.

Pesticides may be applied in different forms and different ways to serve various purposes. In order that you may know how to select the right form and apply it properly, read the following explanations:

Surface Sprays

Surface sprays are applied to surfaces in the home where insects are likely to crawl. The spray particles are coarse, and they dampen or wet the surfaces. When the spray dries, a thin deposit of insecticide remains. For several weeks or months, the deposit kills insects that crawl over it.

You may buy these sprays in pressurized containers; or you

may buy a liquid insecticide and apply it with a household hand sprayer that produces a continuous coarse spray.

Caution: Do not spray oil-base insecticides on asphalt-tile floors, because they may dissolve the asphalt. They may also soften and discolor some linoleums and some plastic materials; if in doubt about spraying such surfaces, test the spray on a small, inconspicuous place. If you apply an oilbase insecticide to the cracks in a parquet floor, apply it lightly; an excessive amount may dissolve the underlying cement, and the dissolved cement may stain the floor.

Space Sprays and Aerosols

Space sprays and aerosols are designed for application into the air. They are especially effective against mosquitoes, houseflies, and other flying insects. They may also be used to penetrate the hiding places of other insects such as roaches, and drive them into the open where they may be killed with a surface spray or dust.

The particles, or droplets, of a space spray are much finer than those of a surface spray, and float in the air for a time. The particles of an aerosol are finer than those of a space spray, and float in the air for a longer time.

Space sprays leave little residue, and generally should not be used as surface sprays. Aerosols are entirely too fine for surface application.

You may buy space sprays in pressurized containers; or you may buy liquid insecticide and apply it as a space spray with a household hand sprayer having a nozzle that produces very fine particles. Household aerosols are available in pressurized containers.

Some sprays sold in pressurized containers may be labeled for both surface and space applications. If you use one of these products for spraying in the kitchen or pantry, first place cooking and eating utensils, and food, where they will not be contaminated by falling particles.

Dusts

Insecticidal dusts usually contain the same active ingredients as sprays. They are used for surface applications, and may be blown by a household hand duster into cracks, corners, and other places difficult to reach with sprays.

Paintbrush Application

Insecticide may be applied to surfaces in liquid, cream, or paste form with a paintbrush. This method often permits a more accurate placement of the material than does spraying or dusting. It is particularly recommended where only spot treatments are needed.

Cream or paste insecticides

SPACE-SPRAY AND AEROSOL APPLICATION

Before applying a space spray or aerosol, close all windows and doors tightly. Apply the chemical into the air as directed on the container label. Some people may be allergic to the materials in space sprays or aerosols. After application, leave the room, close the door, and do not reenter for half an hour or longer. Breathe as little as possible of the chemicals discharged in space sprays or aerosols. Before occupying the room, air it thoroughly.

are usually available in stores where liquids and dusts are sold.

Poisoned Bait

Poisoned bait, as the name implies, is a bait on which a pest will feed, and to which a pesticide has been added.

In the home, poisoned baits may be used to control rodents and some other pests. Frequently they are more hazardous to humans and pets than other forms of pesticide. If you use a poisoned bait, handle it with extreme care; follow the directions and observe all precautions on the container label.

Buying the Right Pesticide

In this bulletin the active ingredients of pesticides are referred to by their *common* names. You may find that the labels on some pesticide containers in retail stores call the active ingredients by their *chemical* names. The accompanying table will aid you in buying the right pesticide; it shows the common and chemical name for each active ingredient.

COMMON AND CHEMICAL NAMES OF PESTICIDES

Common name	*Chemical name*[1]
Diazinon	*O,O*-diethyl *O*-(2-isopropyl-4-methyl-6-pyrmidinyl) phosphorothioate.
Lindane	99 + % gamma-1,2,3,4,5,6-hexachlorocyclohexane.
Malathion	*S*-[1,2-bis(ethoxycarbonyl)ethyl]*O,O*-dimethyl phosphorodithioate.
Methoxychlor	1,1,1-trichloro-2,2-bis(*p*-methoxyphenyl)ethane.
Perthane	A mixture of diethyl diphenyl dichloroethane (95 percent) and related reaction products (5 percent).
Propoxur	*O*-isopropoxyphenyl methylcarbamate
Pyrethrum	Pyrethrum or pyrethrins.
Ronnel	*O,O*-dimethyl *O*-(2,4,5-trichlorophenyl) phosphorothioate.
Strobane	Terpene polychlorinates (65-percent chlorine).

[1]The chemical name shown on the label may not always be exactly as shown here; variation is possible in the arrangement and inclusion of numbers.

HOUSEHOLD PESTS

Many pests that invade homes are present at all times in all parts of the United States. Some occur only at certain times or in certain areas.

The following pages tell what the pests look like, what they do, and how they may be controlled. Most of the illustrations are greatly enlarged.

Ants

Several species of ants, similar in appearance, invade homes. Some ants have wings, and termites readily shed their wings soon after emerging in buildings. Because of these facts, ants are often mistaken for termites.

The two insects, however, may be readily distinguished: Ants are constricted, or "pinched in," at the waistline; termites have no constriction in the waistline. Also, the rear wings of an ant are considerably smaller than the front wings, and often are attached to them; there is little difference in size between the rear and front wings of a termite.

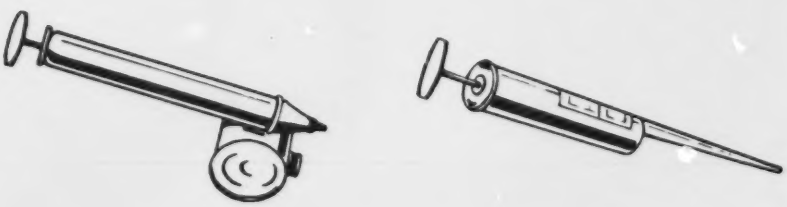
Habits and damage

Ants crawl over any food they can reach, spoil it for human consumption, and carry bits of it to their nests.

They usually do not attack fabrics, leather, or similar materials found in homes. They seldom attack perfectly sound wood; but some species damage wooden structures, particularly old houses, by establishing their nests in the decaying woodwork.

How to control ants

Locate the ants' nest, if possible. It may be outdoors; or it may be in the house—within a



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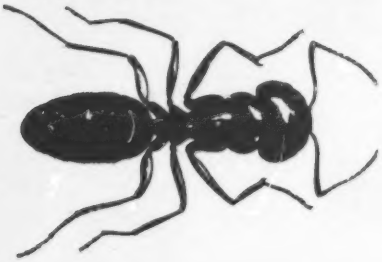
Equipment commonly used for application of pesticides in the home: *Left*, hand sprayer; *right*, hand duster.



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Ant.

wall or partition, under flooring, under a pile of papers, or in an out-of-the-way corner. You may be able to trace the ants' line of march from the food source to the approximate location of the nest.

If you find the nest, treat it with insecticide. If the nest is outdoors, seal off all cracks and openings into the house, through which the ants may be able to enter.

What insecticide to use.—Apply a liquid household insecticide containing diazinon, lindane, malathion, or propoxur.

How to apply.—To treat most places, apply the insecticide as a surface spray. For kitchen treatments, you may prefer to apply the liquid with a small paintbrush that will place it exactly where you want it.

Apply insecticide to surfaces over which the ants are crawling in their line of march. Treat all cracks, openings, or runways they may be using to enter the house or to enter a room. These may include—

- The lower part of window frames, and around doors.
- Supports, posts, pillars, or pipes that the ants might use as runways into the house.
- Cracks in baseboards, walls, and floors, and around sinks, bathtubs, toilets, and kitchen cupboards.
- Openings around electrical outlets and plumbing or heating pipes.

Allow a few days for the ants to reach the insecticide deposits. If the pests continue to appear, they probably are entering over surfaces you have not treated. In this event, treat those surfaces.

Bats

Sometimes bats enter a home and establish their roost in the attic, in a space between the

Winged ant.

BN-21580

Termite.

BN-21581

Common brown bat.

walls, or in an unused part of an upper story. When this occurs, the bats should be gotten rid of as soon as possible.

Habits and damage

These flying mammals stay in their roosts during the day, and fly at night in search of insects, on which they feed.

Normally bats are harmless, but they are subject to rabies; a bat infected with this often-fatal disease can transmit it to humans.

Bats are objectionable also because of the noises they make and the bad odor that emanates from their droppings and urine. This odor persists long after a roost is broken up, and may attract a new colony of bats unless thorough sanitary measures are taken.

Control of bats

Batproofing.—First make sure all bats are out of the house. Then cover openings through which they might enter with sheet metal or ¼-inch-mesh hardware cloth. Leave no opening larger than ¼ inch.

Fumigation.—It may be necessary to fumigate the infested areas. This operation is dangerous. Do not attempt it yourself. Employ a professional exterminator.

Never handle live bats; you may be exposed to rabies. Also, wear rubber gloves when picking up and destroying dead bats.

An exterminator has the experience and equipment needed to bring about successful control of bats.

Bed Bugs

The mature bed bug is brown, flattish, and between ¼ and ⅜ inch long. When engorged with food (blood) the body becomes elongated and swollen, and the color changes from brown to dull red. The change in size, shape, and color is so great that bugs in different degrees of distention may appear to be of different species.

These pests are no longer common in the United States,

BN-21582

Bed bug.

but they do occur—in the most luxurious residences as well as in the modest homes.

Bed bugs may be carried into the home from theaters, hotels, rooming houses, or public transportation facilities. They may hitchhike into your house in bundles of laundry.

Habits and damage

A female bed bug lays her eggs in cracks and crevices. These may be where parts of a bed are joined together, around the tufts of a mattress, or in a suitcase touching the end of a bed.

Bed bugs feed on blood—usually human blood—and their bites may cause severe itching. They avoid the light, and are seldom seen. Evidences of bed bug infestation (other than itching bites) are black or brown spots on surfaces where the bugs have been resting; these spots are digested blood. There usually is an offensive odor in rooms where bed bugs are numerous.

Bed bugs are objectionable also because they soil bed linens and mattresses. It never has been proved, however, that they are disease carriers in the United States.

How to control bed bugs

Once these pests enter an occupied house, only the application of insecticide will remove them.

What insecticide to use.—Household surface sprays containing lindane, malathion, ronnel, or pyrethrum are usually effective against bed bugs. Sometimes the bugs are resistant to lindane.

Lindane, ronnel, or malathion may require only one application; pyrethrum usually must be applied several times at intervals of 1 or 2 weeks.

How to apply.—Spray the slats, springs, and frames of beds. Apply enough spray to wet them thoroughly.

Cover the mattresses completely with spray, but do not soak them; be sure to get the spray into seams and tufts. *Do not treat mattresses with a spray containing more than 0.1 percent of lindane or 1 percent of malathion; higher concentrations of these materials are not safe to use on mattresses. Allow mattress to dry before use.*

Spray baseboards, and the openings or cracks in walls and between floorboards. If some bed bugs are present several weeks after treatment, spray again.

For further information on bed bugs, see Leaflet 453, "How To Control Bed Bugs." Copies of this and other publications mentioned in this bulletin can be purchased from the Superintendent of Documents, Washington, D.C. 20402, or from any U.S. Government Printing Office bookstore across the country. Write to Superintendent of Documents for price information. Be sure to include your return address and ZIP Code.

Centipedes

House centipedes do not damage food supplies or household furnishings and do not have a poisonous bite. However, the presence of these pests is annoying and may be unnecessarily frightening.

Habits

Most centipedes normally live outdoors. In some areas, however, one species of long-legged centipede thrives indoors, where it feeds on soft-bodied insects and spiders.

How to control centipedes

To kill these pests, use a household surface spray containing lindane. Apply the spray directly on the pests. Sweep them up with a broom and dustpan.

BN-21583

Centipede.

Clothes Moths and Carpet Beetles

Two species of clothes moths and four species of carpet beetles (buffalo moths) are serious pests of fabrics in the home.

Adults of both species of clothes moths look very much alike. They are yellowish or buff, and have a wingspread of about ½ inch. Fully grown larvae are white and have dark heads; they are about ½ inch long.

Adults of the black carpet beetle have solid black bodies and brownish legs. The larvae are yellowish, golden, or dark brown; their bodies are tapered from head to posterior, where there is a tuft of long, brown hairs; they grow to be ½ inch long.

Adults of the other three species of carpet beetles have mottled colorings of white, brown, yellow, or black. The larvae are elongate and oval; they have brownish or black bristles, and grow to be ¼ inch long.

Habits and damage

The larvae of clothes moths and carpet beetles feed on wool, mohair, hair, bristles, fur, feathers, and down. They attack clothing and a wide range of household furnishings including blankets, rugs, carpets, drapes, pillows, hair mattresses, brushes and upholstery.

How to control clothes moths and carpet beetles

To control these pests you must (1) practice good housekeeping, (2) apply protective treatments to susceptible articles, (3) use surface sprays, and (4) store articles properly.

BN-21584

Adult clothes moth.

Good housekeeping.—Clean your home often enough to prevent lint, dust, and hair from accumulating. Give close attention to—

- Rugs and carpets.
- Drapes and upholstered furniture.
- Closets, especially those in which woolens and furs are kept.
- Radiators, and the surfaces behind them.
- Corners, cracks, baseboards, moldings, and other hard-to-reach surfaces.

The vacuum cleaner is your best tool for most of this cleaning. After using it, dispose of the bag contents promptly; they may include eggs, larvae, or adult insects.

In addition to cleaning rugs and carpets frequently, it is advisable to rotate them occasionally. Rotation is important because insects usually feed under heavy pieces of furniture where cleaning is difficult, rather than in the open where regular cleaning, light, and movement of people keep down infestation.

Protective treatments—One way to protect fabrics, clothing, blankets, and other susceptible materials is to spray them with a stainless household insecticide containing methoxychlor, Perthane, or Strobane. The insecticide should be packaged and labeled for this purpose. Follow directions on the container label.

In treating woolens, you may hang them on a clothesline and spray them lightly and uniformly with insecticide until their surfaces are moist. Do not soak or saturate them. Excessive spray may cause a white deposit after the fabric dries. A slight excess deposit can be removed by brushing.

If the articles are soiled, have them drycleaned before treating. Drycleaning kills all stages of clothes moths and carpet beetles, but it gives no protection against reinfestation; the articles should be treated with insecticide before being stored.

An old but effective method of ridding woolen articles of insects and their eggs and larvae is to brush and sun the articles. Brush thoroughly, especially in seams, folds, and pockets. If they cannot find protection from the light, any larvae missed in brushing will fall to the ground from clothing left hanging in the sun.

If you have woolen rugs or carpeting that needs protective

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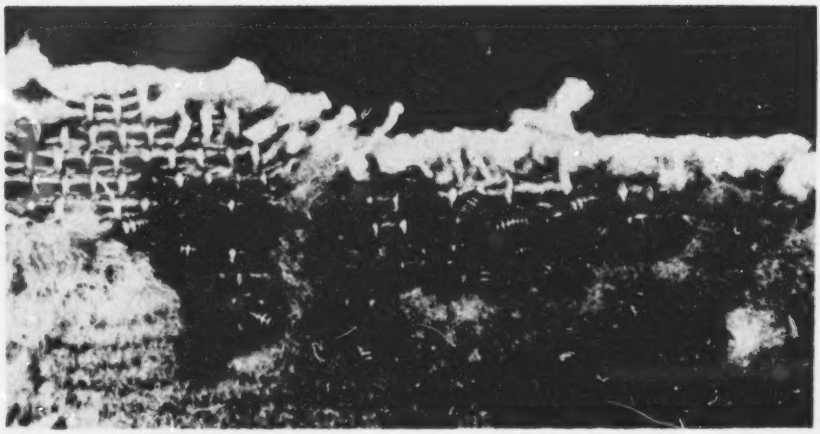
Black carpet beetle larva; lateral view.



BN-21588

Carpet beetle larvae eating pile off carpet.

treatments, get professional help.

Surface sprays.—Treat surfaces over which insects are likely to crawl with a spray that contains 3 to 5 percent of premium-grade malathion or ronnel, or ½ percent of lindane or diazinon.

You may buy these insecticides in ready-to-use pressurized containers that deliver a coarse spray, or you may buy a liquid insecticide and apply it with a household hand sprayer that delivers a continuous coarse spray. When the spray dries it leaves a deposit (thin layer of insecticide), which kills insects that crawl over it.

Surfaces to spray are as follows: Along the edges of wall-to-wall carpeting; behind radiators; along baseboards and moldings; in corners; cracks, and other hard-to-clean places. When spraying closets, take clothing out of the closets and apply the spray to corners; to cracks in the floor, walls, and ceiling; along baseboards; around shelves; and at the ends of clothes rods.

Aerosols.—Aerosol containers deliver a fine spray, which does not moisten surfaces as coarse sprays do; aerosol sprays do not give lasting protection. Do not use aerosols for surface spraying.

Proper storage.—You can protect stored woolens and other susceptible materials by these procedures—

- See that closets or containers used for storage are

Trade names are used in this bulletin solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S Department of Agriculture.

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made as airtight as is practicable. A closet should be tightly closed, and the cracks around the door sealed with tape or rope putty. Protection is lost if the door is opened frequently. Cedar chests are excellent storage containers chiefly because of their tight construction.

● Place paradichlorobenzene crystals, or naphthalene flakes or balls, in the closets or containers before sealing them. As these chemicals evaporate they produce a vapor which, in sufficient concentration, kills both clothes moths and carpet beetles. In a trunk-size container, use 1 pound of crystals, flakes, or balls; in a closet, use 1 pound for each 100 cubic feet of space. The vapors are heavier than air. Therefore the chemicals should be placed in a shallow container on a shelf, or suspended from a clothes rod or hook in a thin cloth bag or perforated container.

Woolens can be protected from feeding damage by wrapping them in paper or sealing them in a cardboard box into which some of the crystals, flakes, or balls have been placed. Before wrapping or sealing, be sure the woolens are not infested. In making a paper bundle, carefully fold back and seal the edges of the paper.

It is recommended that furs be protected from insect damage during the summer months by placing them in commercial storage where they will receive professional care and can be insured against damage.

Cockroaches

Five species of cockroaches are known to infest homes in the United States. When fully grown they range in length from ½ inch to 2 inches, and vary in color from yellowish or reddish brown to black.

Habits and damage

Cockroaches seek warmth, moisture, and food. They hide during the day in sheltered, dark places in the home, and come out at night to forage. They feed on garbage as well as human food; because of this, they may transmit human diseases, particularly some caused by food poisoning organisms.

The female cockroach lays her eggs in out-of-the-way places, in a leathery capsule which she forms at the end of her body. Some females carry the capsule with them until the eggs hatch.

Cockroaches contaminate and spoil human food. They eat starch and glue, and thus may damage fabrics, garments, cur-

BN-21588

American cockroach.

BN-21587

German cockroach.

tains, books, papers and many other materials.

How to control cockroaches

Good housekeeping, and the use of insecticide when necessary, are the only certain means of keeping your home free of cockroaches.

What insecticide to use.—Diazinon, malathion, propoxur, or ronnel will control all kinds of cockroaches. Lindane will control all kinds except, possibly, the German cockroach (see illustration), which in most areas has developed resistance to these materials. If you are troubled with the German cockroach, use only an insecticide containing diazinon, malathion, propoxur, or ronnel. You can use a household surface spray or a dust. For severe infestation, use both. Apply the spray first; then apply the dust after the spray has dried, forcing the dust into the cracks and openings difficult to reach with a spray.

How to apply.—Use an ordinary household spray gun; or use one of the surface sprays commonly sold in retail stores in pressurized cans. Apply enough spray to moisten surfaces thoroughly, but not enough to drip or run.

A space spray or aerosol mist containing pyrethrum may be used to penetrate deeply into cracks, crevices, and other hard-to-reach places. This will rarely kill the roaches but it will drive them into the open where you may kill them with a surface spray or dust.

If you use a dust, apply it with an ordinary household dust gun.

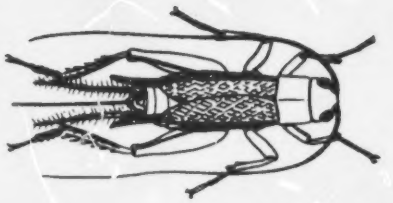
Where to apply.—For best results, insecticide must be applied to places where the roaches hide. Here are some—

- Beneath the kitchen sink and drainboard.
- In cracks around or underneath cupboards and cabinets, and inside them—especially in upper corners.
- Places where pipes or conduits pass along the wall or go through it.
- Behind window or door frames.
- Behind loose baseboards or molding strips.
- On undersides of tables and chairs.
- On closet and bookcase shelves.

When treating cupboards and pantries, take everything from shelves and remove drawers so that food and utensils will not become contaminated by the insecticide.

It is not necessary to treat

the inside of drawers if you have thoroughly cleaned them. However, it is important to treat the sides, backs, and bottoms of drawers, and the inside of the cabinet.



BN-21589

Cricket.

Crickets

There are a number of species of crickets. Usually these insects are not household pests. At times, however, two species—field crickets and house crickets—may enter homes. Occasionally other species are found in basements.

Habits and damage

Field crickets breed outdoors, where they feed on all kinds of vegetation. They enter dwellings late in summer, when vegetation becomes scarce or after crops have been harvested.

House crickets are most troublesome in dwellings located near city dumps or other areas that are being filled with refuse. Large numbers of crickets may develop in these places and swarm to houses at dusk during July to September. In warm climates, house crickets may enter dwellings throughout the year.

Crickets in the home may chew on and damage clothing and other fabrics, particularly if the articles are soiled.

How to control crickets

Close all openings to the house. Tighten screens, windows, and doors. If the crickets still persist in entering, use a houshold spray containing lindane, or malathion. Apply it around baseboards, in closets, and in cracks where the crickets may hide. Dusts containing these insecticides may be used on bare concrete floors of basements or out-of-the-way locations elsewhere in the house.

Fleas

Wherever dogs, cats, or other furry pets are allowed inside the house, fleas may become a problem. Fleas attack humans as well as animals; a house overrun by them is almost impossible to live in.

These pests feed on animal or human blood; they cannot breed or survive without it.

Habits and damage

The female flea lays her eggs on the pet. The eggs fall off and hatch in places where the pet spends most of its time. Indoors, these places may include a chair, sofa, rug, carpet, the pet's bed, or a part of the basement floor.

Larval fleas that hatch from the eggs develop to maturity in

cracks in the floor and other hiding places. A home may become heavily infested with developing larvae before the infestation is noticed.

Adult fleas that result from the developing larvae can live several weeks without food. This explains why people who own dogs or cats having fleas sometimes return from a vacation and find their homes overrun with fleas, even though few or no adult fleas were detected in the house when the people left.

Fleas inflict painful, itching bites, the discomfort of which may last several days to a week or longer. More serious, some species of fleas can transmit to man the dreaded bubonic plague and other diseases.

How to control fleas

Fleas can be controlled in the home by a combination of good housekeeping and the use of insecticide.

Thoroughly clean infested rooms with a vacuum cleaner; include carpets, rugs, upholstered furniture, and other items on which eggs or larvae may be. Then apply insecticide.

BN-21590

Flea.

What insecticide to use.—Apply a surface spray containing methoxychlor, malathion, pyrethrum, or ronnel. Be sure to use a nonstaining product when spraying rugs, carpets, and upholstered furniture.

How to apply.—Treat baseboards, cracks in the floor, rugs, carpets, furniture, and places in the home where the pet habitually sleeps. You may need to repeat the treatment after about a week.

Treating pets.—The best way to prevent flea infestations in the house is to control fleas on the pets. A dust containing 4 or 5 percent of malathion or 5 percent of methoxychlor is safe and effective when applied directly on dogs or cats. Rub it into the fur, to the skin.

House Flies

House flies constitute about 98 percent of the flies that invade the home. They are among the filthiest of insect pests.

Habits and damage

House flies breed in decaying organic matter and feed indiscriminately on manure, garbage, and the food on our tables. They contaminate everything they touch, and spread many human diseases.

How to control house flies

You may keep your home free of house flies by practicing sanitation, using screens, and applying insecticide. If only a few

BN-21591

House fly.

flies are present, you may be able to get rid of them by using a fly-swatter instead of insecticide.

Practice sanitation.—House flies breed in places where garbage or manure accumulates. Clean up these places. See that your garbage cans are equipped with tight-fitting lids; dispose of garbage at least once a week—more often in summer, if possible. Promptly dispose of the droppings of pets. Do not allow food to stand where it will attract flies.

Use screens.—Keep house flies out by placing screens in your windows and doors. See that screened doors swing outward.

Screens that have 14 meshes to the inch will keep out house flies; if the screens have 16 meshes, they well also keep out many smaller insects.

In a humid climate, use screens of copper, aluminum, bronze, plastic, or one of the rust-resisting alloys. In a dry climate, galvanized screens are satisfactory.

Use insecticide.—If you need an insecticide to control the flies in your home, apply a household space or aerosol spray. Be sure the container label says the spray is for *flying insects*; follow the directions.

Mice

At one time or another, almost every housekeeper finds mice to be a source of annoyance and damage.

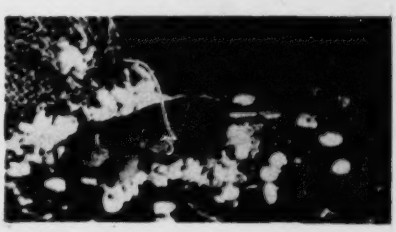
Habits and damage

These little rodents usually migrate from outdoor areas into homes when the weather turns cold in the fall. They eat or contaminate human food, injure fabrics, wood, and other materials, and transmit several human diseases.

How to control mice

The first steps in controlling mice are to seal any holes in the walls, floors, and foundation of the house, and to see that food is not left in places where mice can get to it.

Small infestations.—If there are only a few mice in your home, they can usually be disposed of with ordinary snap traps. The traps should be pla-



BN-21592

House mouse.

ced along walls and near holes. Place them at a right angle to the walls so the trigger mechanism will intercept the mouse's probable route of travel.

One of the best baits to use in snap traps is peanut butter smeared over the trigger surface. Other good baits are cake, flour, bacon, nut meats, cheese, and soft candies, particularly milk chocolate or gumdrops.

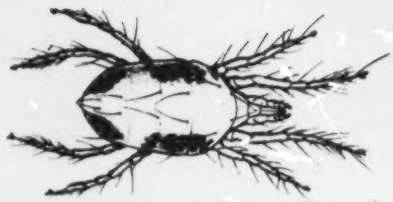
Large infestations.—Where mice are so numerous that trapping is impractical, poison bait may be used. Purchase materials labeled for this purpose. *Follow the directions and observe all precautions on the container label.*

Care should be taken to avoid placing the materials where there is danger of contaminating food supplies. Pesticides should never be left within reach of children, irresponsible persons, pets, or livestock.

A qualified pest control operator (exterminator) may be needed to obtain control of mice. He has the experience and equipment needed to solve your mouse problem.

Mites

The kinds of mites that may bite humans are rodent mites, bird mites, certain food mites, and chiggers. These pests seldom transmit human diseases, but their bites cause swelling, severe itching, and sometimes fever. A chigger attached in a pore of the skin or at the base of a hair may become so enveloped in swollen flesh that it appears to be burrowing into the skin.



BN-21593

Mite—one of several species that attack humans.

Clover mites sometimes infest homes, and they may become a nuisance, but they do not bite people.

Rodent or bird mites can infest and breed in a home where rats or mice or pet birds are present. Bird mites can also enter the home from wild birds that are nesting in a chimney or near a ventilator opening; or they may be carried in from a pigeon or poultry coop on your premises.

Food mites breed in certain foods such as cheese and grains, and may cause skin rash when they get on humans.

Chiggers breed on the ground—not in the house. They may be brought into the house on clothing or pets, and may cause trouble for a short time, but they cannot breed indoors.

Preventing or relieving bites

You may prevent mites from biting you by applying a repellent to your person and clothing. Use a repellent containing deet, ethyl hexanediol, dimethyl

carbate, or dimethyl phthalate; these are available at drug, hardware, or sporting goods stores.

Itching caused by mite bites may be relieved by applying a ointment containing benzocaine.

Controlling mites

You can rid your home of mites that attack people by treating infested places with a household surface spray containing malathion.

If you are troubled by rodent mites, first apply a spray to kill them; then rid your home of the rats or mice from which the mites come. (See "Rats," p. 21; "Mice," p. 16.)

To eliminate the sources of bird mites, get rid of nests near openings in the house. Clean up bird coops and treat them with a surface spray containing malathion.

If food mites are a problem, first get rid of the infested foods. Prevent infestations by keeping all foods well covered, and by keeping shelves and cracks free of spilled food. Infested shelves may be treated with a household surface spray containing not more than 2 percent of malathion. Do not contaminate food or utensils with the insecticide. Cover shelves with clean paper or foil after the spray dries.

To prevent chiggers from breeding on vegetation around your premises, it is necessary to treat the lawn or soil with pesticide. This treatment requires observance of special safety precautions.

For detailed information, see Home and Garden Bulletin 137, "Controlling Chiggers".

Use a vacuum cleaner to capture clover mites if they become numerous indoors.

Mosquitoes

Mosquitoes disturb our sleep by their humming, and inflict itching bites. Some species can infect us with diseases such as dengue fever and encephalitis.

Habits

In most parts of the United States, mosquitoes breed during spring, summer, and fall. In warm, southern areas they may breed throughout the year.

Water is necessary for their breeding. Female mosquitoes lay their eggs on water or in places that later become flooded.

How to control mosquitoes

Eliminate breeding places.— The most effective way to con-

BN-21594

Mosquito.

trol mosquitoes is to eliminate their breeding places from your premises. Follow these steps—

- Remove unneeded, temporary water containers.
- Place discarded automobile tires where water cannot get in them.
- Fill tree holes with concrete.
- See that cisterns, cesspools, septic tanks, fire barrels, rain barrels, and tubs in which water is stored are tightly covered.
- Clean out rain gutters, and examine flat roofs after rains to see that no water remains on them.
- Look for mosquito larvae (wigglers) in the water in flower vases. Look for them also in water that may collect in saucers under potted plants. Replace stagnant water with fresh water.
- Examine fish bowls and aquariums for mosquito larvae. Some kinds of fish eat the larvae; other kinds do not.

Use insecticide.—Adult mosquitoes in your home may be killed readily with insecticide. Use an aerosol spray designed to kill flying insects. Follow directions on the container label.

Certain insecticides may be used also to kill mosquito larvae in breeding places on your premises.

For detailed information on mosquitoes, see Home and Garden Bulletin 84, "Controlling Mosquitoes in Your Home and on Your Premises".

Pantry Pests

Several kinds of insects can infest most of the dry food products you keep in your pantry or kitchen cupboards. Some people refer to these pests as "weevils." Actually, most of them are beetles, or moth larvae. They all may be called "pantry pests."

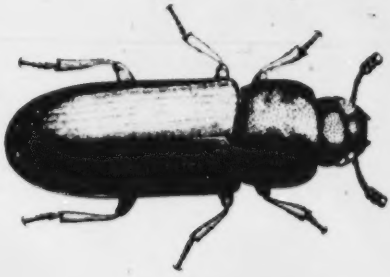
You can control pantry pests by using *all* of the following five measures:

Keep pantry shelves clean

Food gets spilled. Particles sift out of packages and stay on the shelves or lodge in cracks and corners. Insects can live on this material and get into food packages you place on the shelves later. Keep the shelves clean to avoid this source of infestation.

Apply insecticide

If you are troubled by a persistent infestation of pantry pests, treat your kitchen cupboards with insecticide. Wash the cupboards first.



BN-21595

Flour beetle—one of many pantry pests.

Apply a household surface spray containing not more than 2 percent of malathion.

Before buying this insecticide, read the label to make sure it contains the proper amount of active ingredient. Spray lightly; do not over-apply. Spray only when the shelves are empty. When the spray dries, cover the shelves with clean paper or foil before placing packages of food in the cupboard.

Inspect food packages

Almost all dry packaged foods are subject to infestation. Pantry pests also live in spices, especially red pepper, paprika, and chili powder. Inspect all packages for breaks before buying. Do no put infested products on your pantry shelves.

Sterilise doubtful products

If you think a dry food may be infested, but are not sure, sterilize it in the oven at about 140° F. for half an hour or in a home freezer held at 0° F. or below for 3 or 4 days. You may heat small packages as they are. The contents of large packages should be spread on cakepans or piepans so that heat can penetrate easily.

Store in closed containers

Store uninfested or heat-sterilized dry foods in clean metal or glass containers that have tight-fitting lids, such as coffee cans or fruit jars. See that the covers fit tightly enough to prevent tiny insects from crawling in.

Powder-Post Beetles

There are many kinds of powder-post beetles. Among the more common is the old house borer. These pests tunnel in wood of all sorts, including framing and flooring of houses, and furniture. Their larvae feed on the starch of cellulose in the wood.

Some species of powder-post beetles attack hardwoods; others attack softwoods; still others attack bamboo products such as furniture, venetian blinds, and baskets.

Detection

The presence of powder-post beetles in your home may be detected by any of several signs. You may see surface holes in the wood; these may look like small shotholes or they may be as large as 3/8 inch in diameter. There may be little piles of borings near the holes or, where overhead timbers are attacked, on the floor beneath the holes. You may see adult

BN-21598

Adult powder-post beetle—one of several species.

beetles, ... 1 inch long, crawling on ...e wood.

Treatment

Consider whether the control problem is one you can handle yourself. If you have a heavy infestation, or one that is behind paneled walls or in some other hard-to-reach place it may require the services of an experienced pest-control operator who has the necessary equipment.

Also, the wood may be so badly damaged that its structural strength is impaired; if so, it should be replaced.

If the infestation is light and easy to reach, and if the wood is sound, you may be able to handle the control job yourself. A household surface spray containing lindane can be applied to surfaces damaged by powderpost beetles.

Rats

Rats destroy or pollute human food, transmit diseases, and damage property. If cornered they are dangerous, and will attack people or pets. They enter homes to find food and shelter.

There are four essential measures for getting rid of rats in the home: (1) Starve them, (2) remove their shelter, (3) kill them, and (4) keep them out.

Starve them

Leave no food in open places; this includes food in unopened cardboard containers. Place garbage and refuse promptly in tightly covered metal containers.

Remove their shelter

Keep storage places orderly and clean. In the basement and storerooms, stack lumber, boxes, cartons, and other objects on racks at least 1 foot above the floor.

If your house has double walls with spaces between ceilings and the floors below, make sure the spaces are tightly sealed. Rats make their homes in these spaces if they are accessible.

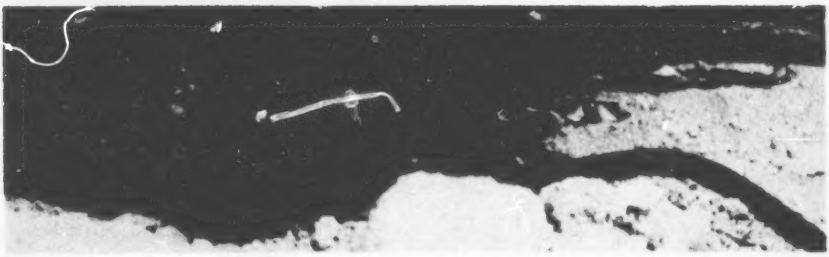
Kill them

Poisoned bait is recommended as the best means of killing rats. Purchase a suitable bait, labeled for this purpose. Follow directions on the label and *observe the precautions to the letter.* Poisons should never be left within the reach of children, irresponsible persons, pets, or livestock.

Traps are also an effective means of killing rats in the home, but their use requires skill and much time. Traps are recommended where infestations are very small, or as a followup after the use of bait.

Keep them out.

Close all holes in exterior walls. See that spaces around doors, windows, and other necessary openings are no larger than ¼ inch. If rats are a serious problem in your neighbor-



BN-21597

Norway rat—a species that invades homes in the United States.

hood, install self-closing devices on frequently used doors to the outside.

Where rats are a neighborhood problem, community action should be taken; assistance should be asked of your local board of health.

Pest control operators (exterminators) are trained in control of rats. They have had experience in rat control and have the equipment needed to bring about the desired control.

Scorpions

Scorpions occur usually in southern parts of the United States. Occasionally they enter homes. Their sting is painful and the sting of some species may be fatal.

Habits

Scorpions feed mostly on insects and spiders. When they get into the home, they hide during the day in close quarters—in closets, attics, folded blankets, shoes, and papers. At night they seek a place where water is available. Usually they will not sting unless they are molested.

How to control scorpions

Use insecticide.—The best way to keep scorpions out of the home, or to kill them if they already are in, is to use a household surface spray containing lindane. Apply the spray to baseboards, around window and door casings, and to the foundation of the house.

On the outside, use the spray

BN-21598

Scorpion; dorsal view.

also to treat the lower parts of tree trunks, stumps, piles of lumber, and rock walls. A waterbase spray is preferred for outdoor use; ready-to-use household sprays often contain oils that may burn vegetation.

Cautions: If scorpions are in your neighborhood, do not have a children's sandbox in which the pests may lurk.

If a scorpion should sting you, call your physician at once; the first 6 hours after a sting are the most critical

BN-21599

Silverfish.

Silverfish and Firebrats

Silverfish and firebrats are slender, wingless insects, ⅓ to ½ inch long. They are similar in appearance. Silverfish are shiny and silver or pearl gray; firebrats are mottled gray. The two pests cause the same kinds of damage.

Habits and damage

These insects are active at night, and usually hide during the day. Silverfish live and develop in damp, cool places—particularly in basements. Firebrats prefer very warm areas in the home, such as the attic in summer and near the furnace in winter.

Both insects crawl along pipelines and through openings in the walls or floors; they may be found in any part of the house.

Silver fish and firebrats cause damage in homes by eating foods and other materials that are high in protein, sugar, or starch. They eat cereals, moist wheat flour, any paper on which there is glue or paste, the sizing in paper (including wallpaper and bookbindings), starch in clothing, and rayon fabrics.

How to control silverfish and firebrats

Apply insecticide in the form of a surface spray or a dust. The results may not be immediate; but if the insecticide is properly and thoroughly applied, it will leave a residue that should be effective within a few weeks. If satisfactory control is not achieved in 2 or 3 weeks, make additional applications.

If you are troubled with firebrats but not with silver fish, you may need to apply insecticide only to warm parts of the house.

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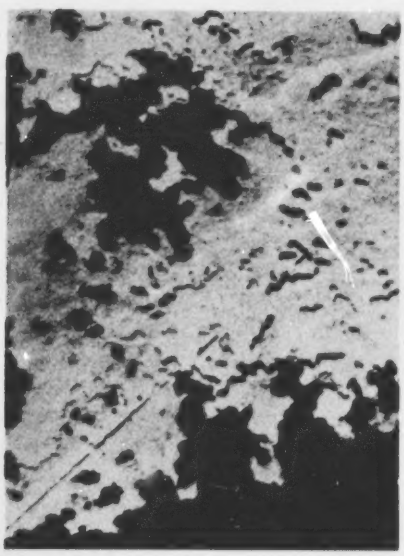
Firebrat.



BN-21600

Parts of envelope damaged by silverfish. These pests attack any paper, including wallpaper, on which there is glue, paste, or sizing.

Applying sprays.—Use a household spray containing lindane, diazinon, ronnel, malathion or propoxur.

Apply the spray to baseboards, door and window casings, closets, and places where pipes go through walls.

Some sprays have oil-solution bases; *do not apply these near electric motors, gas pilot flames, or other places where they may start fires.*

Applying dusts.—Use a dust containing not more than 6 percent of chlordane, 1 percent of lindane, or 5 percent of malathion.

Apply the dust with a hand duster. Blow it into cracks and on surfaces of the places recommended for sprays.

Dusts may be applied safely to places where oil-solution sprays might start fires.

Spiders

Most species of spiders that occur in the United States are harmless to humans. They destroy many injurious household insects, and are therefore beneficial.

A dangerous species, and one to watch out for, is the black widow spider. The female of this species is about ½ inch long and shiny black. The front and back parts of the body are globular; the legs are long and slender. It usually has a red, orange, or brownish-yellow mark shaped like an hourglass on the underside, but sometimes this marking is of a different shape or is absent.

BN-21602

Black widow spider.

Habits and damage

Black widow spiders are not aggressive; they are shy, but will bite instinctively when touched or threatened. The female inflicts a seriously poisonous bite which can be fatal. The bite causes extreme pain which usually extends to the abdominal muscles, where it localizes. A person bitten by this spider should call a doctor immediately.

Black widow spiders seldom appear in living quarters of homes, but often are found in basements, in basement window wells, beneath lawn benches or porches, and in garages, tool sheds, old lumber piles, trash piles, sand boxes, and outdoor toilets.

Another dangerous spider is the brown recluse. This and several closely related ones are found in various States. The brown recluse is known to cause sores that are slow to heal when it bites.

The victim may not be aware of the bite for several hours, or there may be intense pain at once. The brown recluse is found in a part of the United States bounded on the east by western Georgia northward into Kentucky and westward to Kansas and Texas. If you feel intense pain continuing after being bitten by a small brown spider (⅜ inch long), call a doctor immediately.

For detailed information on the control of the brown recluse spider, see Leaflet No. 556, "Controlling The Brown Recluse Spider."

How to control spiders

The following treatment to control black widow spiders may be used to control all spiders in the home:

- Remove loose brick, wood, tile, or trash from around the yard or basement where the spiders may live or hide.
- Use a stick or broom to knock down webs, spiders, and egg sacs. Crush them underfoot.
- Apply a pesticide to spider-infested areas. Use a household spray containing lindane.

***Caution:** Do not spray spiders overhead. A spider hit by the spray may drop straight down but still be capable of biting for some time.*

Termites

Termites cost the people of the United States many millions of dollars each year in repairs to structures and in control measures.

There are two major kinds of termites—subterranean, and nonsubterranean. The former occurs in every State except Alaska, but is particularly prevalent in the southern half of the country. The latter is restricted to the southern half of the country and the Pacific Coast States.

Subterranean termites live in nests in the ground, close to a source of wood, and often build tunnels upward to attack the wood in structures above them.

Nonsubterranean termites fly directly to the wood they attack, and live in colonies, in cavities they make in the wood itself. They damage all kinds of wooden objects including structural timbers, furniture, posts, poles, and piles of lumber.

The techniques of termite control are too extensive for adequate discussion in this publication. To control nonsubterranean termites, call a pest control operator. He has the experience and equipment to solve the problem.

BN-21603

Termite.

Ticks

Several kinds of ticks may be found in your yard and in other open spaces. Only one kind of tick—the brown dog tick—frequently infests homes in the United States. This tick is a parasite of dogs. It does not breed in the woods or in open country.

Habits and damage

If there are ticks in your home, they probably are brown dog ticks that entered on your dog.

After feeding on the dog, brown dog ticks hide in places such as cracks and crevices, under carpets and rugs, upholstered furniture, and behind baseboards. There the female

BN-21604

Brown dog tick.

lays her eggs; and each stage of each successive generation of ticks eventually finds the dog, feeds on his blood, and drops off to seek hiding places in the home and keep the cycle going.

Brown dog ticks rarely bite humans; they do not carry human disesases. However, their presence in the home is annoying, and they can make your dog's life very uncomfortable.

How to control ticks

Treatment should start with the dog. Have him dipped in a bath containing a suitable insecticide—usually malathion. This task may be assigned to a veterinarian.

If you choose to do it at home, buy an emulsifiable concentrate containing 50 percent of malathion. Mix 1 tablespoon of the concentrate with each gallon of water. Dip the dog in the mixture. Do not include his head, but sponge his ears with the mixture if necessary. For a large dog, make up the mixture in a bucket and pour it slowly over the dog's back; make sure it soaks through the hair to the skin.

The next procedure is to get rid of new broods of ticks that are developing in the home. Use a household insecticide containing lindane, malathion or diazinon. Spray or paint it on cracks in the floor, around baseboards and window casings, on places where the dog habitually sleeps, and on other places where ticks may be hiding. Repeat after 2 or 3 months. A malathion spray may be applied to rugs, carpets, or upholstered furniture. Be sure the container label states that it will not stain.

Wasps

The term "wasp" applies to hornets, yellow jackets, mud daubers, cicada killers, and a wasp known only by its scientific name, *Polistes*. All are slender-waisted, flying insects.

Habits and damage

All these wasps except mud daubers and cicada killers build paper nests in bushes, in trees, under eaves, or in the ground. Mud daubers build clay or mud nests, often under eaves. Cicada killers build sizable tunnels in well-drained slopes of ground.

Wasps are beneficial because they kill destructive insects. However, they can inflict serious and sometimes even fatal stings. They should be controlled when their nests are in places where the wasps are a hazard to human comfort and safety.

How to control wasps

Treat the nest with a household surface spray or a dust containing chlordane. Direct the insecticide as closely as possible into the nest opening.

For outside use, a water-base spray is preferable to one having an oil base. Apply it with a household or garden-type applicator.

BN-21605

Wasp.

If you use a dust, apply it with a hand duster or garden-type duster. The extension tube of a garden-type duster may be inserted into the nest opening; two or three strong puffs of dust will filter through the nest, and usually will kill the colony within 24 hours.

After treating an underground nest, throw a shovelful of moist earth over the entrance. This will prevent the dying wasps from reaching the surface.

All treatments should be made at night, when there is less danger of being stung. *If a person having a history of asthma, hayfever, or other allergy is stung by a wasp, his physician should be notified immediately.*

For further information on wasps, see Home and Garden Bulletin 122, "Controlling Wasps".

USE PESTICIDES SAFELY

If not handled and applied properly, many household pesticides can injure humans or household pets.

Read the label.—The first rule of safety in using *any* pesticide is to *read and follow the directions and precautions on the container label.* Do this *each time* you use a pesticide; don't depend on your memory. Many pesticide manufacturers include leaflets of instructions with their products. Carefully read these also.

Store pesticides safely.—Store pesticides as directed on their labels, in closed, well-labeled containers, where children or pets cannot reach them. Do not place them near food. Do not store them under the sink, in the pantry, or in the medicine cabinet.

Always leave pesticides in their original containers. Be sure the labels remain on them. If a pesticide is marked "POISON," there will be an antidote statement on the label. Read it.

Do not save or reuse empty containers.

Apply pesticides safely.—Determine the right amount of the right pesticide to use.

Be careful not to get pesticide on food, dishes, or cooking utensils.

Remove aquariums, birds, cats and dogs, and other pets and their food and water pans before applying pesticide. Keep

children away from application areas.

When the label warns against breathing pesticidal mists or dusts, open windows and doors while applying them.

Handle oil-base sprays as though they were flammable.

Place poison baits out of reach of children and pets. (Poison baits account for almost half of the accidental deaths resulting from pesticides in children under 12 years of age.)

Avoid spilling an insecticide on the skin and keep it out of the eyes, nose, and mouth. If you spill any on the skin or clothing, remove contaminated clothing immediately and wash the skin thoroughly with soap and water. Launder clothing before wearing it again.

Do not smoke while handling a pesticide.

Wash your face and hands with soap and water after using a pesticide.

If you accidentally swallow some pesticide, observe any antidote instructions on the pesticide label and call a physician at once. Read the label to him, naming the active chemical ingredient. If you cannot immediately reach a physician by telephone, call your fire or police department. These agencies can help you locate a physician or get you to a hospital. Some cities have poison control centers at one or more hospitals.

NOTE: Registrations of pesticides are under constant review by the U.S. Environmental Protection Agency. Use only pesticides that bear a Federal registration number and carry directions for home and garden use.

Do not dispose of surplus pesticides where they may be a hazard to fish or wildlife. Do not discard them outdoors. Do not dispose of them where they may contaminate water. If you have trash-collection service, wrap small containers in several layers of newspapers, tie securely with heavy string or cord, and place them in the trash can.

Several of the household pests discussed in this bulletin require difficult methods of control, or procedures that may be hazardous if not properly followed. For these pests, reference is made to publications that contain detailed information on control and necessary precautions. In some instances it is recommended that the reader obtain the services of a reputable pest control operator who has the experience and equipment to do an efficient, safe job.

Washington, D.C. Revised March 1976

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 45 cents
Stock Number 001-000-03468-5
Class No. A 1.77:96/5
25% discount allowed on orders of 100 or more to one address.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1976 O—586-190

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